# GoldenHeart Project

Arman Pathan, Saket Thakare, Ajinkya Thakare, Sarthak Singhal

[#]*Computer Engineering Department, San Jose State University*
*One Washington Square, San Jose, CA, USA 95192-0180*

ajinkya.thakare@sjsu.edu
arman.pathan@sjsu.edu
saket.thakare@sjsu.edu
sarthak.singhal@sjsu.edu

*Abstract*— **This paper describes the Goldenheart project wherein we have built a web application and an API which integrates itself across all online businesses. The main goal of our API is to provide a list of charities to the respective business's customers based on the customer profile.**

***Keywords*— Goldenheart, Charity, Recommendations, Dashboard, Business, APIs , Comparisons**

## I. Introduction

We're presenting this document as a final report for Fall 2018 Enterprise Software Platforms under the guidance of Prof. Rakesh Ranjan from the department of Computer Engineering at San Jose State University. He advised us in designing a micro service showing list of charities which can be integrated by any business to donate to charity.

GoldenHeart project aims to bring together businesses and charities on a single platform. Using the website, the businesses and charities will be registered with us to use our API. Once they have been registered, a business can show a list of charities to its customers and ask its users to choose a charity. The business will then donate a certain percentage of the purchase price to the charity selected by their customer. The unique thing in GoldenHeart is that our API will consume the business customer's data and predict the charities which the customer is more likely to choose.

Using our API, businesses will be able to increase the customers engagement in doing some good for the community. The charities registered with us, will be able to increase its funding since they will be matched to the customers who are more like to choose it.

## II. GOLDENHEART FRONTEND CLIENT

The client side of the web application is based on RESTful web services and has been designed using Bootstrap, ReactJS and ReduxJS. The user of our web app could be an E-Business or a Charity organization. Business or Charity can register on our web app and start using our services by logging into our web app. We have implemented all the basic validation and exception handling on the client side to ensure our web app accepts only the valid appropriate input. We've used PassportJS to encrypt the password of our users. All resources are accessible via API calls to the backend using axios. For example, if the charity needs to register, they need to fill out a small 4 step registration form wherein the cahirty can select various inputs and dropdowns and upload their logo and submit the form. An API call is made at the backend and charity then gets registered with Goldenheart. Registered charities can login and check the statistics such as total earnings, total donations etc. which gives analytics about how well the charity is performing.

## III. GOLDEN HEART BACKEND SERVER

The server side of GoldenHeart is based on NodeJS as the backend server and MongoDB as the database. Various authentication middlewares such as Joi and Express validation have been used to ensure that only valid inputs are entered in the database. The main functionality of API is based on python. We have queried data from Mongodb using PyMongo and trained our KNN model (N=7) because we found that highest accuracy for our model was at N=7. Once our model was trained we were able to predict which category of charity the customer was more likely to choose. Based on this predicted category, we found out top 8 charities which lie within 100 miles radius of user's location. This response is redirected to the Node server in the form of JSON Object and then finally sent to the frontend client where it is displayed.

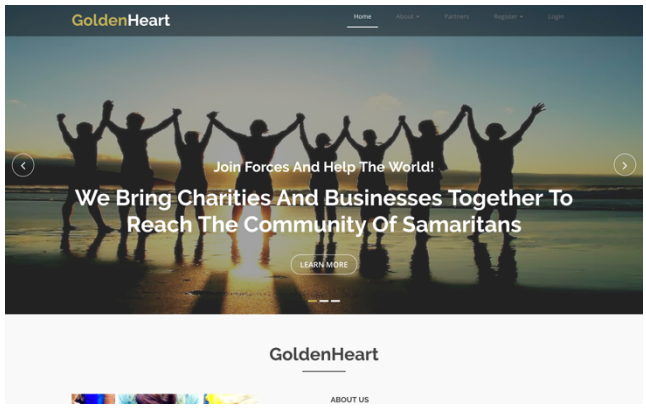


Fig. 1 Home Page of GoldenHeart Web Application

## IV. DEPLOYMENT OF GOLDENHEART APPLICATION

We've deployed and hosted GoldenHeart application on Amazon Web Services. The application is divided in multiple modules and each module is hosted individually as application on PaaS provider Heroku and EC2 instance. Frontend Application, API gateway and ML service are separate applications. Separation provides modularity and can help scalability. A pipeline to our Heroku git ensures Continuous integration this helps in easy deployment and maintenance of the application. Frontend React application is hosted using zeit/serve static file server. To manage server process on EC2 Ubuntu instance we use PM2 for node.js based application and a WSGI container for Python based ML service. API gateway and ML service refer a common database hosted on mlab

## V. Services Offered By The Application

GoldenHeart offers various services to the business owners and the charity organizations such as:

### A. *Charity Dashboard*

This service provides statistics and analytics about charity to the respective charity owners. Information about number of donations, total earnings, total views of the charity listed are queried from the database and shown to the end user i.e. Charity organization. Based on these statistics, analytics such as increase or decrease in views or donations is also visually represented using a graph for a duration of time. (days, months or years)

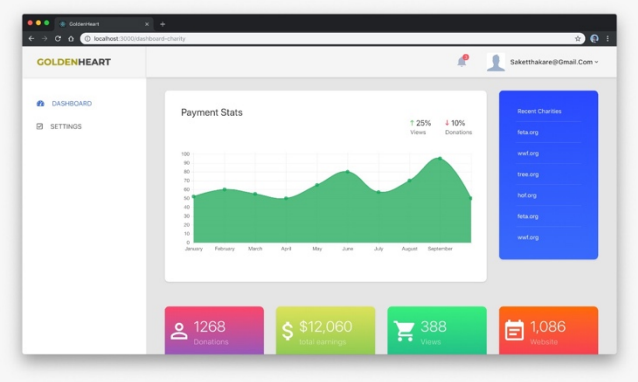


Fig. 2: Charity owner Dashboard

### B. *Business Dashboard*

This service provides statistics and analytics about charity to the respective business owners. Information about number of donations, total earnings, total views of the charity listed are queried from the database and shown to the end user i.e. E-Business organization. Based on these statistics, analytics such as increase or decrease in views or donations is also visually represented using a graph for a duration of time. (days, months or years).

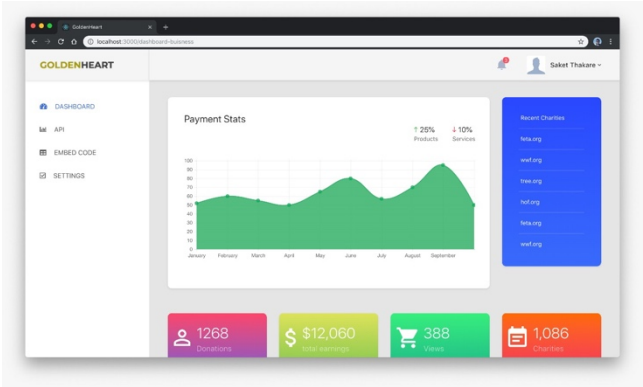


Fig. 3 Business Owner Dashboard

### C. *Charity Recommendations*

This service recommends charities to the customer based on the customer's profile. The API consumes the customer's data such as age, gender, latitude, longitude and uses Machine Learning (KNN) Algorithm where (N=7) to predict charities that are more likely to be chosen for donation. Our Machine learning model matches interests of the customer from their profile provided by the E-Business website and recommends related charities to the customer. We have used two datasets for GoldenHeart Project. First dataset contains around 1500 charities in the United States. Second dataset contains the user information of around 45,300 users in United States.

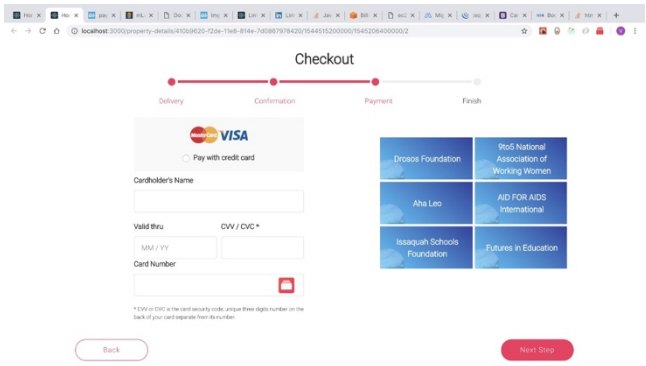


Fig. 4 Integrated API showing charity recommendations on payments page

### D. *API integration*

This service provides an API in the form of a URL to access the list of charities tailored based on the customer profile. This API can be integrated or embedded on any business website's payment page. This API can be used by any website irrespective of their underlying architecture because the call to an API is redirected to GoldenHeart's backend server and the results are queried from our database and returned back in reponse as JSON Objects. The response can be handled as desired by the respective Business owners.

## VI. STAKEHOLDERS

GoldenHeart Project has the following stakeholders.

(a) Business Provider:

An online business provider can suggest relevant charities to it's user based on their profile and preferences using Machine learning algorithms.

(b) Charity Organizaiton:

A charity can increase its exposure to a wider audience and influx in donations via multiple business providers by registering once on goldenheart.com and using its API.

(c) Business Service Consumer:

An online business service consumer can donate a certain percentage of his/her purchase to suggested charities based on his/her profile and the prospective charities he/she is more likely to donate to.

## VII. CONCLUSIONS

GoldenHeart project provides a platform for both businesses and charities in the form of a web application and an API which can be integrated on any Business's payment page. GoldenHeart API recommends charities based on customer data using Machine Learning. Thus, the customer of the E-Business is more likely to choose a charity based on their chairtable interest and thus more likely to contribute to the donation and increase funding for the charities.


## ACKNOWLEDGMENT

We sincerely thank Prof. Rakesh Ranjan for guiding us through our project and for his constructive suggestions and valuable insights during the planning and implementation of GoldenHeart Project.


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